FIG. 1

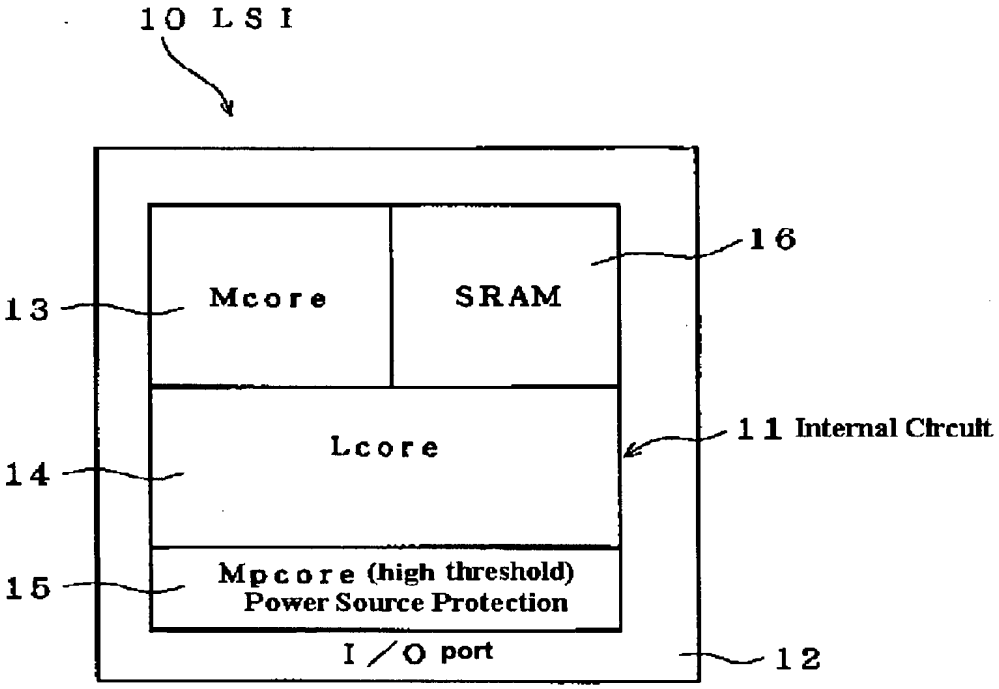

10 LSI
16
13
Mcore
SRAM
Lcore
11 Internal Circuit
14
15
Mpcore (high threshold)
Power Source Protection
I/O port
12

FIG. 2

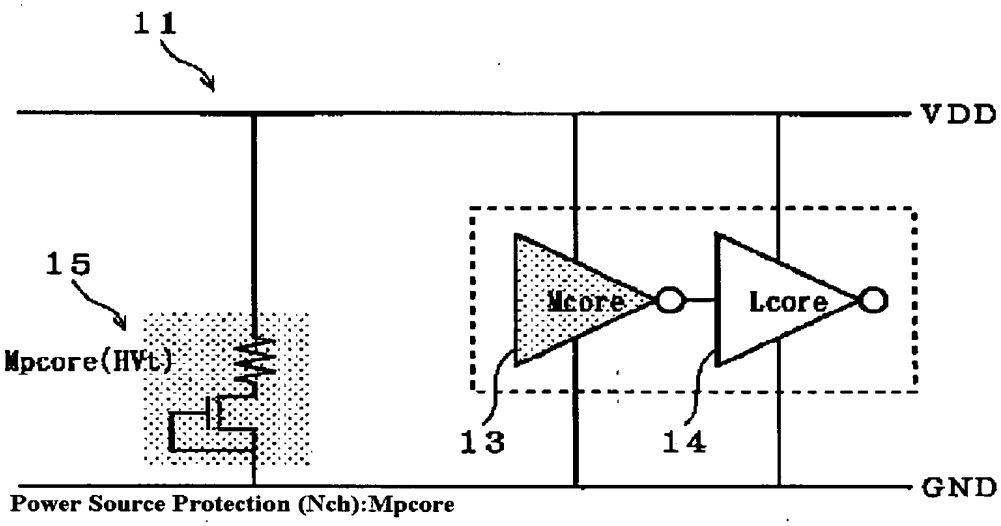

11
VDD
15
Mpcore(HVt)
Mcore
Lcore
13
14
GND
Power Source Protection (Nch):Mpcore

FIG. 3

	Internal Circuit		Power Source Protector	I/O (External Interface)
	Mcore	Lcore	Mpcore(HVt-M)	
thickness of gate dielectric layer (nm)	1.9	2.6	1.9	(7.2)
operating voltage (V)	1.2	1.2	1.2	(3.3)
threshold voltage Vt	low	high	higher than Mcore	
leak/off current	large	small	smaller than Mcore	
speed	high	low		
power consumption	large	small		
breakdown voltage of gate dielectric layer	low(about 5V)	high (about 7V)	same as Mcore	(high, about 10V)

FIG.4a

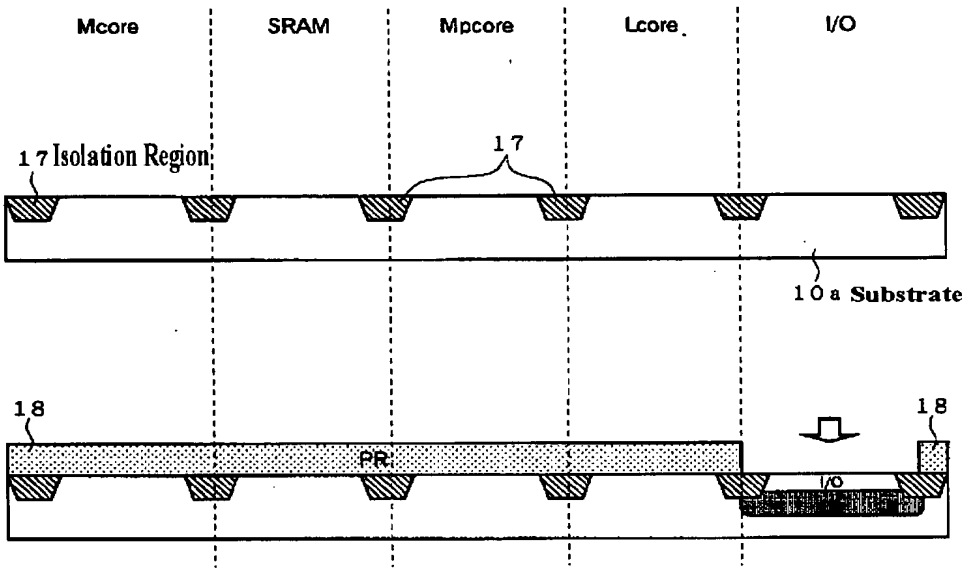


FIG.4b

FIG.5c

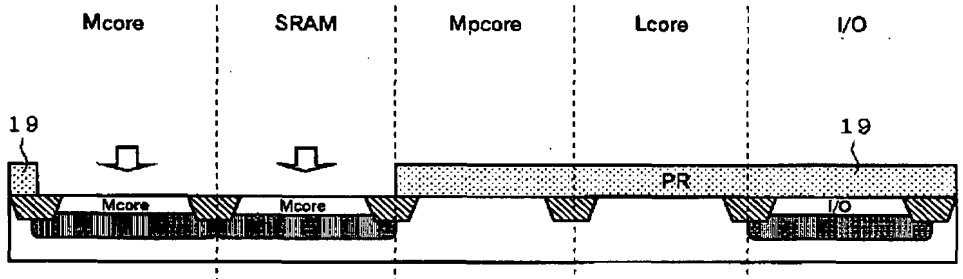


FIG.5d

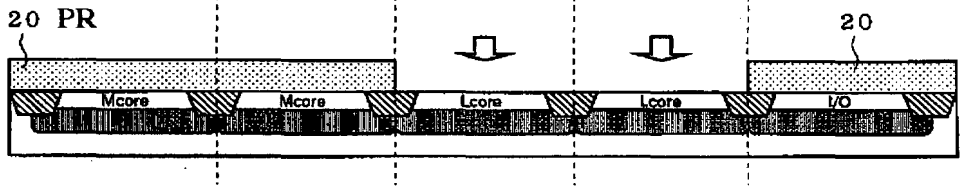


FIG.6e

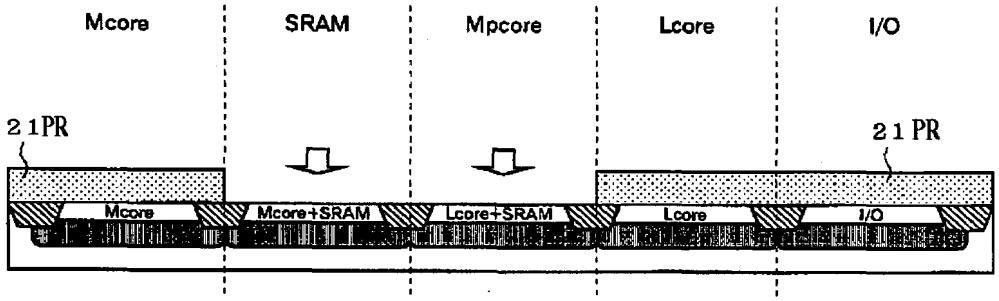


FIG.7f

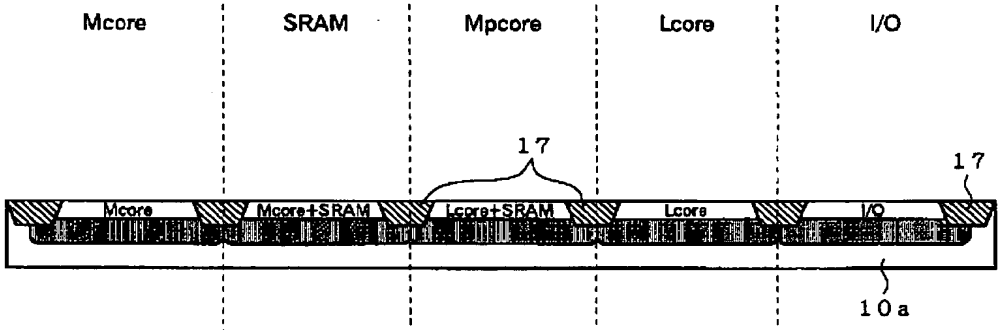


FIG.7g

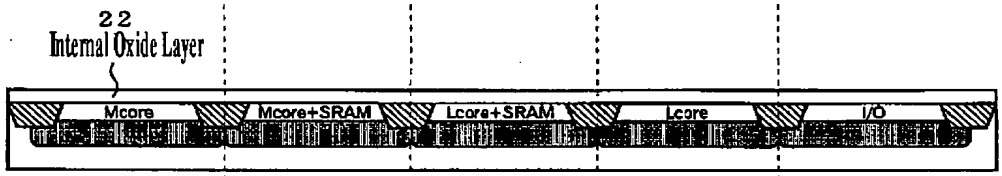


FIG.8h

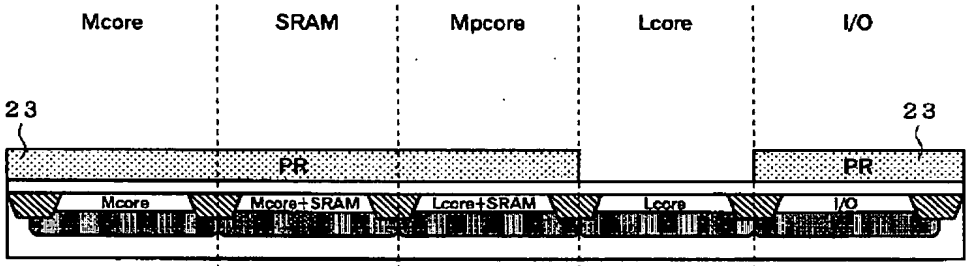


FIG.8i

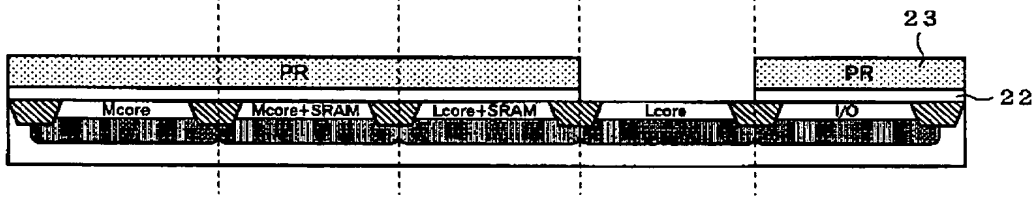


FIG.9j

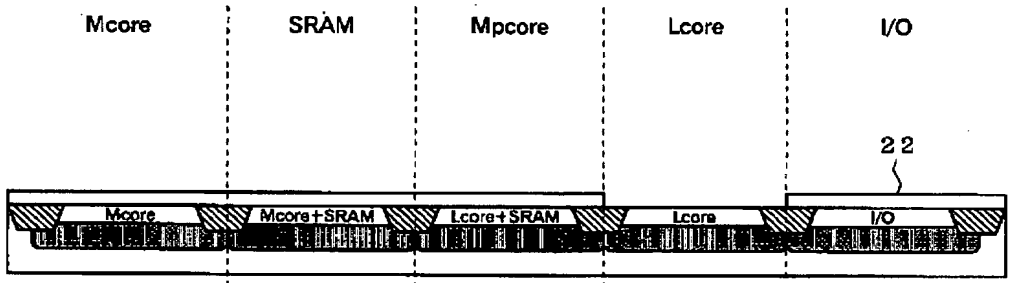


FIG.9k

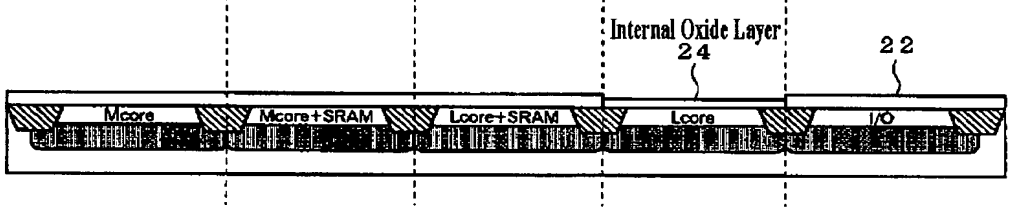


FIG.10l

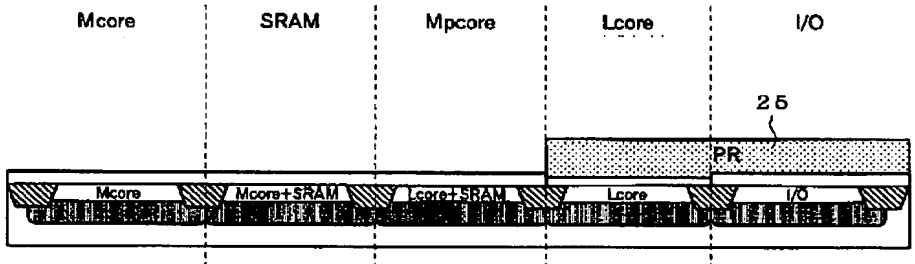


FIG.10m

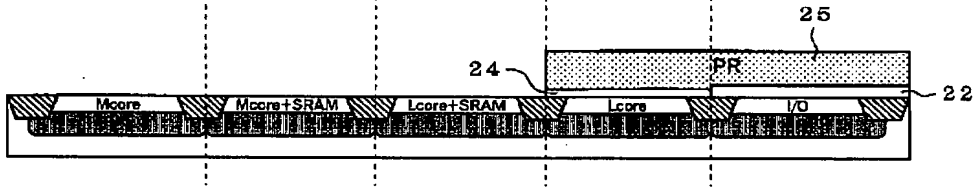


FIG.11n

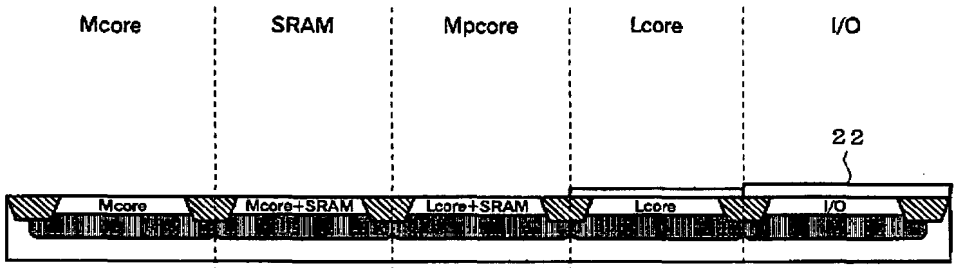


FIG.11o

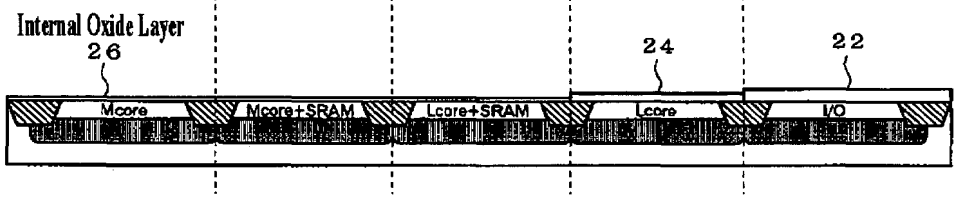


FIG.12a

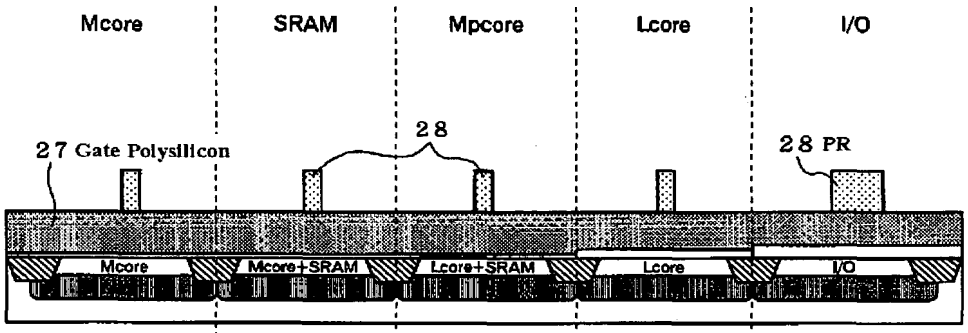


FIG.12b

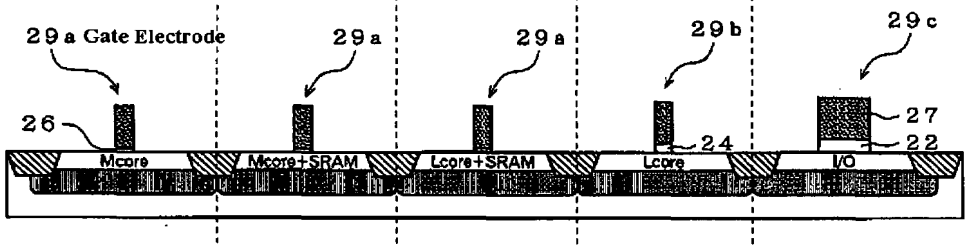


FIG.13c

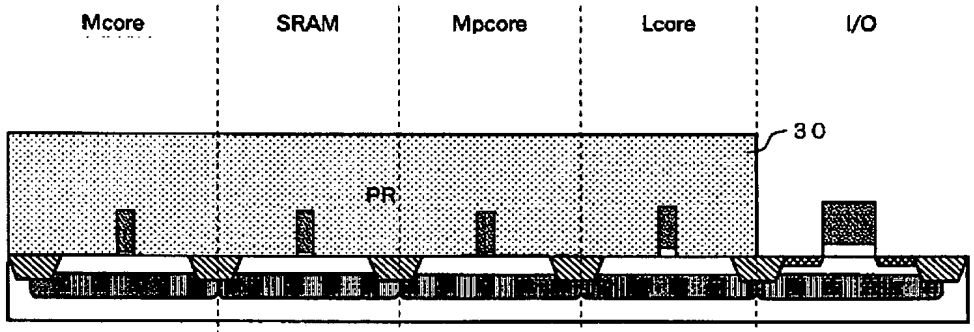


FIG.13d

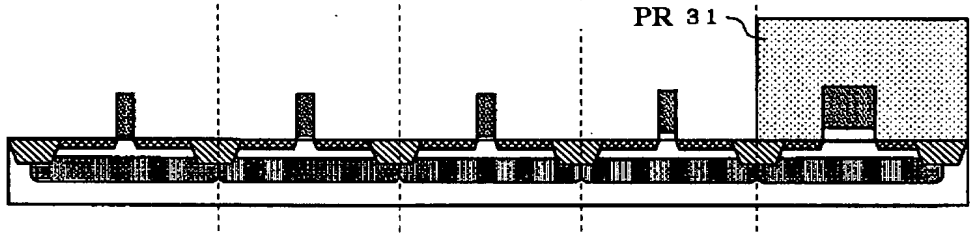


FIG.14e

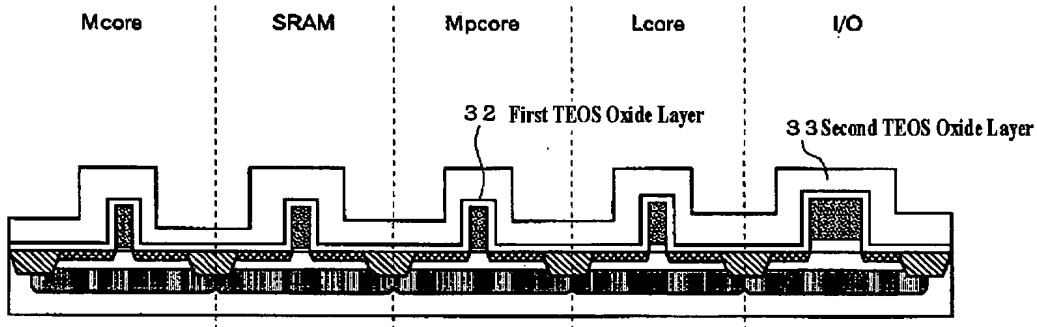
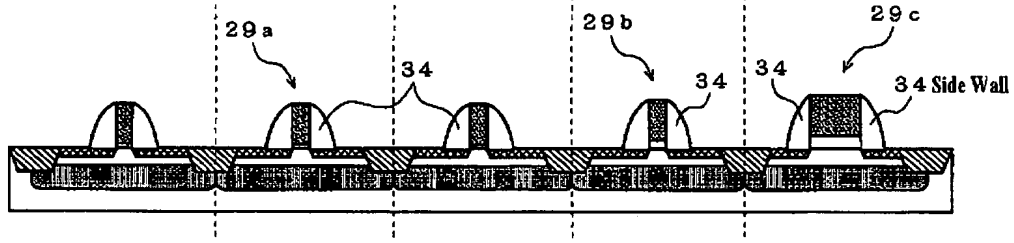


FIG.14f



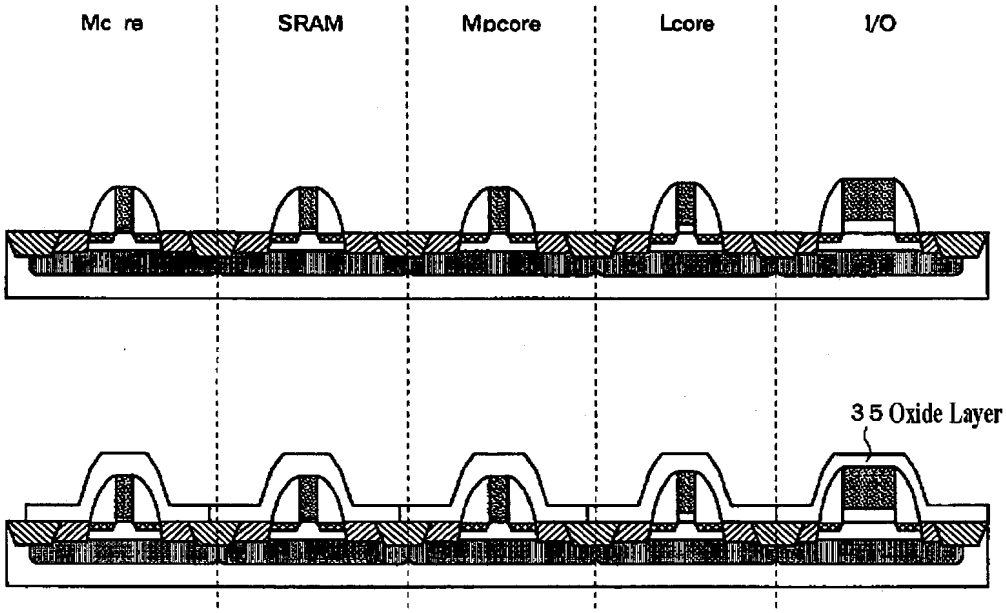


FIG.15g

FIG.15h

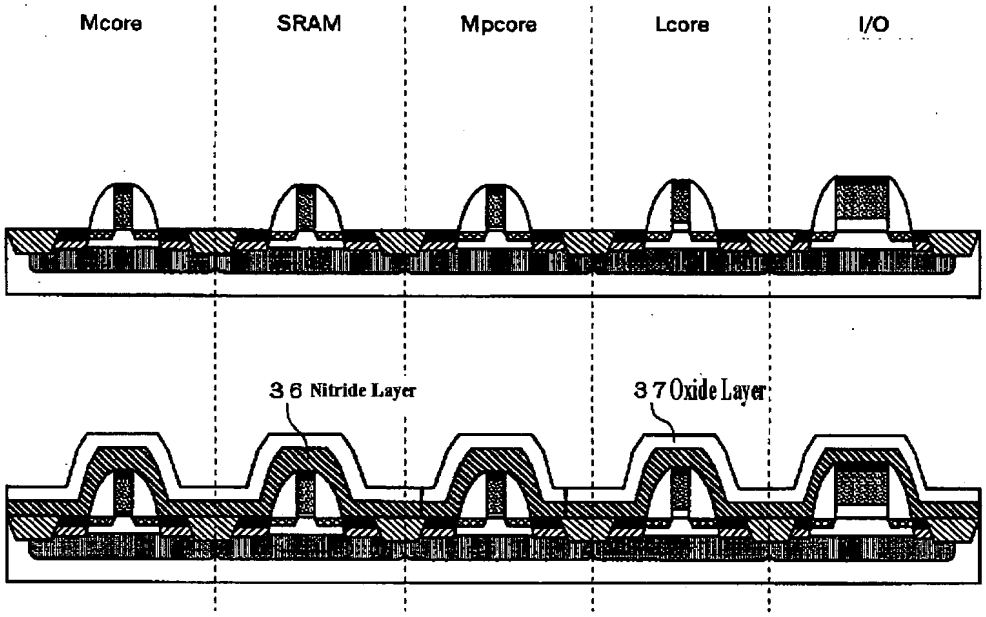


FIG.16i

FIG.16j

FIG.17k

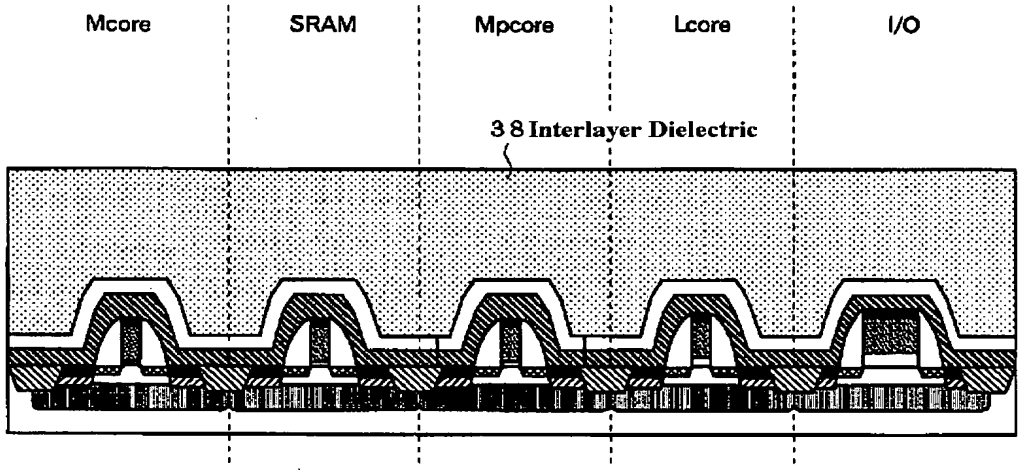


FIG. 18